the transgene comprises a transcriptional regulatory element functional in cells of the organism operatively linked to a polynucleotide sequence encoding a fusion protein which activates transcription of said *tet* operator linked gene,

the fusion protein comprises a first polypeptide which Tet repressor operatively linked to a second polypeptide which directly or indirectly activates transcription in eukaryotic cells,

said *tet* operator-linked gene confers a detectable and functional phenotype on the organism when expressed in cells of the organism,

said transgene is expressed in cells of the organism at a level sufficient to produce amounts of said fusion protein that are sufficient to activate transcription of the *tet* operator-linked gene; and

in the absence of tetracycline or a tetracycline analogue in the organism, said fusion protein binds to the *tet* operator-linked gene and activates transcription of the *tet* operator linked gene such that the *tet* operator-linked gene is expressed at a level sufficient to confer the detectable and functional phenotype on the organism, wherein the level of expression of the *tet* operator-linked gene can be downmodulated by administering tetracycline or a tetracycline analogue to the organism.

24. A transgenic organism having a transgene integrated into the genome of the organism, wherein:

the transgene comprises a transcriptional regulatory element functional in cells of the organism operatively linked to a polynucleotide sequence encoding a fusion protein which activates transcription of a *tet* operator linked gene,

the fusion protein comprising a first polypeptide which is a Tet repressor, operatively linked to a second polypeptide which directly or indirectly activates transcription in eukaryotic cells, and

said fusion protein is expressed in cells of the organism.

25. The organism of claim 23, wherein the second polypeptide of the fusion protein comprises a transcription activation domain of herpes simplex virion protein 16.

26. The organism of claim 24, wherein the second polypeptide of the fusion protein comprises a transcription activation domain of herpes simplex virion protein 16.

27. The organism of claim 23, wherein the transgene is integrated at a predetermined location in the genome of the organism.

28. The organism of claim 24, wherein the transgene is integrated at a predetermined location in the genome of the organism.

29. The organism of claim 27, wherein the transgene is integrated at a predetermined location such that expression of the fusion protein is controlled by 5' regulatory elements of an endogenous gene of the organism and expression of the endogenous gene is controlled by at least one *tet* operator sequence.

30. The organism of claim 28, wherein the transgene is integrated at a predetermined location such that expression of the fusion protein is controlled by 5' regulatory elements of an endogenous gene of the organism and expression of the endogenous gene is controlled by at least one *tet* operator sequence.

31. The organism of claim 23, wherein the *tet* operator-linked gene is a second transgene comprising a gene of interest operably linked to at least one *tet* operator sequence.

32. The organism of claim 24, wherein the *tet* operator-linked gene is an endogenous gene that has been operatively linked to at least one *tet* operator sequence.

33. The organism of claim 23, which is selected from the group consisting of: a mouse, a cow, a sheep, a pig, and a plant.

34. The organism of claim 24, which is selected from the group consisting of: a mouse, a cow, a sheep, a pig, and a plant.--

REMARKS

Claim 1 was originally filed in the application and has now been canceled. New claims 23-34 have been added. Accordingly, claims 23-34 are pending.

The title has been amended to more accurately reflect the subject matter being claimed in the application. The specification has been amended to correct the priority claim. New claims 23-34 are directed to transgenic organisms having tetracycline-regulated transcriptional regulatory systems. Support for these claims can be found